IBM POUGHKEEPSIE

Diagnostic Engineering Publication

1410/7010

Dept. B59, Bldg. 965
Date 11/15/63

Subject: Diagnostic Program — CC01A - 1410/7010 Limited CPU Instruction Test

Sequence Number 001

Replaces New Program

This Program uses no System or Channel Control Cards

This Program should be run only from tape.

Enclosures: 44 Pages
Card Deck for CARD ONLY SYSTEMS (as punched by UP51)
8 Cards - Card Loader (1-7) and 1 Core Clear
160 Cards No. 001-160 Data Cards
1 Card Execute Card

Distribution:
X 1410
X 7010
Other

CC01A

11/15/1963

1410/7010 LIMITED CPU INSTRUCTION TEST

CONTENTS OF CC01 WRITE UP AND LISTING

2.xx.00.0 TEST DESCRIPTION

2.xx.00.1 MODIFICATIONS

CC01A is the first release version of this program and it does not obselete any program.

2.xx.00.2 DESCRIPTION

CC01 was taken directly from C021 to test enough of the basic instruction set to read in and operate the Tape Control Program. It does not contain any Error Typeouts, Loops, Tad Controls or Options to repeat, it is strictly a special purpose test that runs prior to the Tape Control Program and halts for any error.

The Load Program utilizes a few instructions to Load CC01 and they are: BCE, MRCW, MLCS, BA1, RT, BEX1 , MLCWA and a Branch instruction.

This test will only be used in conjunction with the Tape Control Program operating from tape.

2.xx.00.3 EQUIPMENT REQUIRED

Minimum Storage
One tape Unit on any channel
Console Printer

2.xx.00.4 CARD DECK

7	Cards	L1 Loader
1	Card	Core Clear
160	Cards	Program Cards
1	Card	Execute (Branch to 1972) to operate TC50

2.xx.00.5 ENGINEERING LEVEL

CC01 will operate on any 1410/7010 system unless an Engineering Change modifies the operations of the standard Instruction set.

2.xx.01.0 LOADING PROCEDURES

2.xx.01.1 1410 TAPE INPUT

A. Display and Alter Locations 00000-00011 as follows:

1. RL%B000011$. If tape unit on E channel
2. XL¤B000011$. If tape unit on F channel

B. Set Mode switch to RUN, Computer Reset and Start.

2.xx.01.2 7010 TAPE INPUT

A. If tape unit is on E channel, use 7010 Load Key and disregard steps (B) and (C)

B. If tape unit is not on E channel, Display and Alter Locations 00000-00011 as follows:

1. XL¤B000011$. If tape unit on F channel
2. 3L?B000011$. If tape unit on G channel
3. 1L!B000011$. If tape unit on H channel

C. Set MODE switch to Run, Computer Reset and Start.

2.xx.02.0 OPERATING PROCEDURES

No special instructions are necessary to run this program. The test is ONE, QUICK check of a portion of the basic instruction set and unless there is an error it immediately reads in TC50 and begins to operate TC50

2.xx.03.0 OPERATING HINTS AND COMMENTS

If there is an error the program will stop. The CE must then consult the listing to find out which instruction failed and determine if he can continue. It is possible to continue to the next instruction by pushing the Start Key. If a number of errors occur it would not be possible for TC50 to operate. If there are a few errors it may be possible that TC50 will work and be able to bring into Core C020 or C021 to completely check out CPU instructions and give the CE the benefit of different Loops and Options.

At Location 01000-01100 is a pattern of characters to be looked at only by the C. E to determine if there are any Information Transfer errors between TAU and CPU.

2.xx.04.0 PROGRAM STOPS

All stops are Error Stops

2.xx.05.0 TYPEOUTS

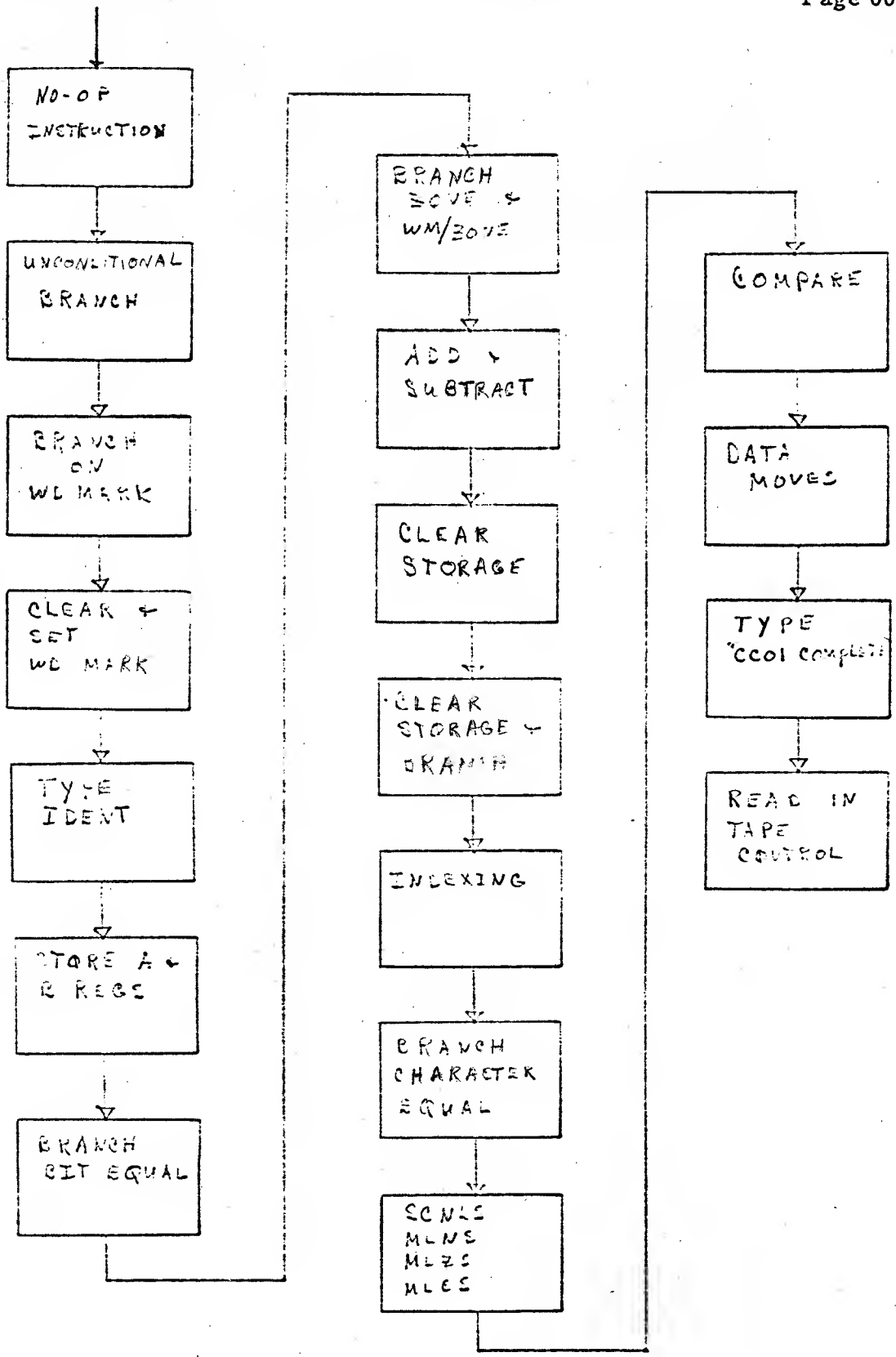
2.xx.05.1 NORMAL

"CC01A" Test Ident.
"CC01 COMPLETE" Indicate End of Test.

2.xx.05.2 ERROR

None.

FLOW CHART


NO-OP INSTRUCTION
UNCONDITIONAL BRANCH
BRANCH ON WL MARK
CLEAR & SET WL MARK
TYPE IDENT
STORE A & B REGS
BRANCH BIT EQUAL
BRANCH ZONE & WM/ZONE
ADD & SUBTRACT
CLEAR STORAGE
CLEAR STORAGE & BRANCH
INDEXING
BRANCH CHARACTER EQUAL
SCNLS MLNS MLZS MLCS
COMPARE
DATA MOVES
TYPE "CC01 complete"
READ IN TAPE CONTROL

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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1002                CTL    2
1003                LDAD
1004      CTLIND    EQU    1245
1005      IDENT     EQU    1250
1006      START     EQU    2000
1007      *
1008                DRG    CTLIND                                               01245
1009                DC     @0010R@          SEQUENCE AND MEM SIZE           5   01249
1010      *
1011                DRG    IDENT                                                01250
1012      *
1013                DCW    @CC01A@,G        PROGRAM IDENT                   5   01254
1014      *
1015                DRG    1000                                                 01000
1016      *
1017                DCW    @1122334455667788990OAABBCCDDEEFFGG@            34  01033
1018                       @HHIIJJKKLLMMNNOOPPQQRRSSTTUUVVWWXX@             34  01067
1019                       @YYZZ  .□BTM&$*B,L-/,%SSMY#@.TMM @,G             32  01099
                                  LLG   R.D   WBS   .GTQ
1020      *
1021                ORG    1800                                                 01800
1022      *
1023                SBR    *&9              COMMON TYPE ROUTINE             7   01800  G 01815 B
1024                WCP    0                                                10  01807  M %TO 00000 W
1025                SBR    *&20                                             7   01817  G 01843 B
1026                BCB1   *-23                                             7   01824  R 01807 2
1027                BA1    *&1                                              7   01831  R 01838 M
1028                B      0                                                7   01838  J 00000
                                                                                       G
1029      *
1030      *
1031                SBR    *&61             INTERNAL ADDRESS ALTER ROUTINE  7   01845  G 01912 B
1032                RCP    *&26                                             10  01852  M %TO 01887 R
1033                BEX1   *-16,M                                           7   01862  R 01852 M
                                                                                       T
1034                BNT1   *&32                                             7   01869  R 01907 B
                                                                                       S
1035                BA1    *&1                                              7   01876  R 01883 M
                                                                                       G
1036                RCPW   0                                                10  01883  L %TO 00000 R
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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1037                BEX1   *-16,S                                           7  01893  R 01883 SMG
1038                BA1    *&1                                              7  01900  R 01907 M
1039                B      0                                                7  01907  J 00000
1040      *
1041                ORG    START                PROGRAM BEGINS HERE                   02000
1042      ********************************************************************
1043      *
1044      * ROUTINE 01.00    CHECK LONG NO-OP INSTRUCTION
1045      *
1046                NOP                                                     1  02000  N
1047                DC     a 1234567890#a.GTSTMB/STUVWXYZ‡,%WBSSSMa        32  02032
1048                       a-JKLMNOPQR.$*B,L&ABCDEFGHIM.¤RO'QBTLLGMa       32  02064
1049      ********************************************************************
1050      *
1051      * ROUTINE 02.00    CHECK UNCOND BR INST.  THIS ROUTINE ASSUMES THAT
1052      *                  WM-BL WILL GIVE INSTRUCTION CK IF BRANCH FAILS
1053      *
1054                B      *&1                  SET AND STEP IAR TO SAME ADDRESS     7  02065  J 02072
1055                B      *&2                  SHOULD SKIP FOLWNG INVALID OPCODE    7  02072  J 02080
1056                DCW    a a                                                   1  02079
1057      ********************************************************************
1058      *
1059      * ROUTINE 03.00    CHECK BRANCH ON WORD MARK INSTRUCTION
1060      AC        BW     AD,AD                SHOULD NOT BR, INST CK IF IT DOES   12  02080  V 02105 02105 1
1061                BW     AE,*&1               SHOULD BRANCH, INST CK IF NO BR     12  02092  V 02106 02104 1
1062                DCW    a a                                                   1  02104
1063      AD        DC     aGMa                                                  1  02105
1064      ********************************************************************
1065      *
1066      * ROUTINE 04.00    CHECK CLEAR AND SET WORD MARK INSTRUCTIONS
1067      *
1068      AE        CW     AC,AE                TRY TO CLEAR WMS AT TWO PLACES      11  02106  ¤ 02080 02106
1069                BW     AF-1,AC              SHOULD NOT BR, INST CK IF IT DOES   12  02117  V 02165 02080 1
1070                BW     AF,AE                DITTO                               12  02129  V 02166 02106 1
1071                SW     AE,AC                RESTORE WMS PREVIOUSLY CLEARED      11  02141  , 02106 02080
1072                BW     *&4,AE               TEST AE FOR WORD MARK               12  02152  V 02167 02106 1
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PGLIN   LABEL   OPCOD   OPERAND                                          CT  ADDRS  INSTRUCTION
1073    AF      DCW     @ 12@                 INSTRUCTION CK IF NO WM AT AE   3  02166
1074            BW      *&2,AC                TEST AC FOR WORD MARK         12  02167  V 02180 02080 1
1075            DCW     @ @                   INSTRUCTION CK IF NO WM AT AC  1  02179
1076    ********************************************************************
1077    *
1078    * ROUTINE 05.00   TYPE IDENT, CK TYPEWR BUSY, HALT, HALT/BR.
1079    *                 THESE OPS PERFORMED ONLY FIRST TIME THROUGH
1080    *
1081            NOPWM                                                        1  02180  N
1082            B       AJ                    THIS BR NOT TAKEN FIRST TIME THRU  7  02181  J 02226
1083            SW      *-12                                                 6  02188  , 02181
1084    AG      WCP     IDENT                 TYPE PROGRAM IDENTIFICATION   10  02194  M %TO 01250 W
1085            BCB1    *-16                  BRANCH IF BUSY                 7  02204  R 02194 2
1086            BA1     *&1                   RESET I/O INTERLOCK            7  02211  R 02218 M
1087            ORG     *                     CREATE NEW CARD                   02218
1088    AH      NOP                                                          1  02218  N
1089            B       AJ                    PUT WM HERE FOR NONSTOP OPERATION  7  02219  J 02226
1090            ORG     *                     CREATE NEW CARD                   02226
1091    ********************************************************************
1092    *
1093    * ROUTINE 06.00   CHECK OPERATION OF SAR AND SBR INSTRUCTIONS
1094    *
1095    AJ      B       AK                    I-ADDR MODIFIED WITHIN ROUTINE  7  02226  J 02233
1096    AK      NOPWM             NOTE. BR TO 00000 INDICATES SBR FAILURE     1  02233  N
1097            B       AL              . BR TO 00001 INDICATES SAR FAILURE   7  02234  J 02286
1098            SW      AK&1                                                 6  02241  , 02234
1099            CW      1,AN&1                SET UP A & B ADDR REGISTERS   11  02247  ¤ 00001 02288
1100            SBR     AJ&5                                                 7  02258  G 02231 B
1101            SAR     AJ&5                                                 7  02265  G 02231 A
1102            SBR     AJ&5                                                 7  02272  G 02231 B
1103            B       AJ                                                   7  02279  J 02226
1104    AL      H                                                            1  02286  .
1105    AN      CW      AD&1,2                SET UP A & B ADDR REGISTERS   11  02287  ¤ 02327 00002
1106            SAR     AJ&5                                                 7  02298  G 02231 A
1107            SBR     AJ&5                                                 7  02305  G 02231 B
1108            SAR     AJ&5                                                 7  02312  G 02231 A
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PGLIN  LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1109             B      AJ                                                7  02319  J 02226
1110   AO        CW     AK&1              RESET NOP/BR SWITCH             6  02326  ¤ 02234
1111             SAR    AJ&5              RESTORE I-ADDR OF AJ            7  02332  G 02231 A
1112             SW     1                 SET WM BACK IN LOC 00001        6  02339  , 00001
1113   ************************************************************
1114   *
1115   * ROUTINE 07.00   CHECK OPERATION OF BRANCH BIT EQUAL INSTRUCTION
1116   *
1117   * SUB-RTN 07.01
1118             BBE    AP,*,1            SHOULD BRANCH                  12  02345  W 02358 02356 1
1119             H                                                       1  02357  .
1120   *                                TO LOOP.  FIX BEFORE PROCEEDING.
1121   * SUB-RTN 07.02
1122   AP        BBE    *&8,AQ&11,1       SHOULD NOT BRANCH              12  02358  W 02377 02389 1
1123             B      AQ                                               7  02370  J 02378
1124             H                                                       1  02377  .
1125   * SUB-RTN 07.03
1126   AQ        BBE    *&8,AP&11,L       SHOULD NOT BRANCH              12  02378  W 02397 02369 L
1127             B      AR                                               7  02390  J 02398
1128             H                                                       1  02397  .
1129   * SUB-RTN 07.04
1130   AR        BBE    AU,*,2            SHOULD BRANCH                  12  02398  W 02411 02409 2
1131             H                                                       1  02410  .
1132   * SUB-RTN 07.05
1133   AU        BBE    *&8,AX&11,2       SHOULD NOT BRANCH              12  02411  W 02430 02442 2
1134             B      AX                                               7  02423  J 02431
1135   AW        H                                                       1  02430  .
1136   * SUB-RTN 07.06
1137   AX        BBE    *&8,AU&11,L       SHOULD NOT BRANCH              12  02431  W 02450 02422 L
1138             B      BA                                               7  02443  J 02451
1139   AZ        H                                                       1  02450  .
1140   * SUB-RTN 07.07
1141   BA        BBE    BD,*,4            SHOULD BRANCH                  12  02451  W 02464 02462 4
1142   BC        H                                                       1  02463  .
1143   * SUB-RTN 07.08
1144   BD        BBE    *&8,BG&11,4       SHOULD NOT BRANCH              12  02464  W 02483 02495 4
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PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND		CT	ADDRS	CC01 INSTRUCTION
1145		8	BG		7	02476	J 02484
1146	BF	H			1	02483	.
1147	* SUB-RTN 07.09						
1148	8G	B8E	*£8,BD£11,.	SHOULD NOT BRANCH	12	02484	W 02503 02475 .
1149		B	8J		7	02496	J 02504
1150	BI	H			1	02503	.
1151	* SUB-RTN 07.10						
1152	BJ	B8E	BM,*,8	CHOULD BRANCH	12	02504	W 02517 02515 8
1153	BL	H			1	02516	.
1154	* SUB-RTN 07.11						
1155	BM	B8E	*£8,BP£11,8	SHOULD NOT BRANCH	12	02517	W 02536 02548 8
1156		8	8P		7	02529	J 02537
1157	BO	H			1	02536	.
1158	* SUB-RTN 07.12						
1159	8P	B8E	*£8,BM£11,G	SHOULD NOT BRANCH	12	02537	W 02556 02528 G
1160		8	BS		7	02549	J 02557
1161	BR	H			1	02556	.
1162	* SUB-RTN 07.13						
1163	8S	B8E	8V,*,*	SHOULD BRANCH	12	02557	W 02570 02568 *
1164	8U	H			1	02569	.
1165	* SUB-RTN 07.14						
1166	8V	B8E	*£8,BY£11,8 (S)	SHOULD NOT BRANCH	12	02570	W 02589 02601 8 (S)
1167		8	BY		7	02582	J 02590
1168	BX	H			1	02589	.
1169	* SUB-RTN 07.15						
1170	BY	B8E	*£8,BV£11,L (D)	SHOULD NOT BRANCH	12	02590	W 02609 02581 L (D)
1171		8	CB		7	02602	J 02610
1172	CA	H			1	02609	.
1173	* SUB-RTN 07.16						
1174	C8	B8E	CE,*,-	SHOULD BRANCH	12	02610	W 02623 02621 -
1175	CD	H			1	02622	.
1176	* SUB-RTN 07.17						
1177	CE	B8E	*£8,CH£11,-	SHOULD NOT BRANCH	12	02623	W 02642 02654 -
1178		B	CH		7	02635	J 02643
1179	CG	H			1	02642	.
1180	* SUB-RTN 07.18						

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PGLIN   LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1181    CH        BBE    *&8,CE&11,S,M      SHOULD NOT BRANCH     12  02643  W 02662 02634 S M
1182              B      CK                                        7  02655  J 02663
1183    CJ        H                                                1  02662  .
1184    * SUB-RTN 07.19
1185    CK        BBE    *&8,*,             SHOULD NOT BRANCH     12  02663  W 02682 02674
1186              B      CN                                        7  02675  J 02683
1187    CM        H                                                1  02682  .
1188    * SUB-RTN 07.20
1189    CN        BBE    *&8,CQ&11,         SHOULD NOT BRANCH     12  02683  W 02702 02714
1190              B      CQ                                        7  02695  J 02703
1191    CP        H                                                1  02702  .
1192    * SUB-RTN 07.21
1193    CQ        BBE    *&8,CN&11,C,M      SHOULD NOT BRANCH     12  02703  W 02722 02694 G M
1194              B      CA                                        7  02715  J 02723
1195    CS        H                                                1  02722  .
1196    ********************************************************************
1197    *
1198    * ROUTINE 08.00   CHECK OPERATION OF BRANCH ZONE & BRANCH WM/ZONE
1199    *
1200    * SUB-RTN 08.01
1201    CA        BZN    DD,TPMK,           SHOULD BRANCH         12  02723  V 02736 09017 2
1202    CC        H                                                1  02735  .
1203    * SUB-RTN 08.02
1204    CD        BZN    *&8,QUOT,          SHOULD NOT BRANCH     12  02736  V 02755 09032 2
1205              B      DG                                        7  02748  J 02756
1206    CF        H                                                1  02755  .
1207    * SUB-RTN 08.03
1208    CG        BZN    *&8,DELT,          SHOULD NOT BRANCH     12  02756  V 02775 09048 2
1209              B      CJ                                        7  02768  J 02776
1210    CI        H                                                1  02775  .
1211    * SUB-RTN 08.04
1212    CJ        BZN    *&8,GPMK,          SHOULD NOT BRANCH     12  02776  V 02795 09064 2
1213              B      DM                                        7  02788  J 02796
1214    CL        H                                                1  02795  .
1215    * SUB-RTN 08.05
1216    DM        BZN    DP,QUOT,*          SHOULD BRANCH         12  02796  V 02809 09032 S
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PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND		CT	ADDRS	CC01 INSTRUCTION
1217	DO	H			1	02808	.
1218	* SUB-RTN 08.06						
1219	DP	BZN	*&8,TPMK,*	SHOULD NOT BRANCH	12	02809	V 02828 09017 S
1220		B	DS		7	02821	J 02829
1221	DR	H			1	02828	.
1222	* SUB-RTN 08.07						
1223	DS	BZN	*&8,DELT,*	SHOULD NOT BRANCH	12	02829	V 02848 09048 S
1224		B	DV		7	02841	J 02849
1225	DU	H			1	02848	.
1226	* SUB-RTN 08.08						
1227	DV	BZN	*&8,GPMK,*	SHOULD NOT BRANCH	12	02849	V 02868 09064 S
1228		B	DY		7	02861	J 02869
1229	DX	H			1	02868	.
1230	* SUB-RTN 08.09						
1231	DY	BZN	EB,DELT,-	SHOULD BRANCH	12	02869	V 02882 09048 K
1232	EA	H			1	02881	.
1233	* SUB-RTN 08.10						
1234	EB	BZN	*&8,TPMK,-	SHOULD NOT BRANCH	12	02882	V 02901 09017 K
1235		B	EE		7	02894	J 02902
1236	ED	H			1	02901	.
1237	* SUB-RTN 08.11						
1238	EE	BZN	*&8,QUOT,-	SHOULD NOT BRANCH	12	02902	V 02921 09032 K
1239		B	EH		7	02914	J 02922
1240	EG	H			1	02921	.
1241	* SUB-RTN 08.12						
1242	EH	BZN	*&8,GPMK,-	SHOULD NOT BRANCH	12	02922	V 02941 09064 K
1243		B	EK		7	02934	J 02942
1244	EJ	H			1	02941	.
1245	* SUB-RTN 08.13						
1246	EK	BZN	EN,GPMK,&	SHOULD BRANCH	12	02942	V 02955 09064 B
1247	EM	H			1	02954	.
1248	* SUB-RTN 08.14						
1249	EN	BZN	*&8,TPMK,&	SHOULD NOT BRANCH	12	02955	V 02974 09017 B
1250		B	EQ		7	02967	J 02975
1251	EP	H			1	02974	.

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PGLIN     LABEL     OPCDD  OPERAND                                          CT  ADDRS  INSTRUCTION
1252      * SUB-RTN 08.15
1253      EQ        BZN    *&8,QUOT,&       SHOULD NOT BRANCH               12  02975  V 02994 09032 B
1254                B      ET                                               7  02987  J 02995
1255      ES        H                                                       1  02994  .
1256      * SUB-RTN 08.16
1257      ET        BZN    *&8,DELT,&       SHOULD NOT BRANCH               12  02995  V 03014 09048 B
1258                B      EW                                               7  03007  J 03015
1259      EV        H                                                       1  03014  .
1260      * SUB-RTN 08.17
1261      EW        BWZ    *&8,GPMK,        SHOULD NOT BRANCH               12  03015  V 03034 09064 3
1262                B      EZ                                               7  03027  J 03035
1263      EY        H                                                       1  03034  .
1264      * SUB-RTN 08.18
1265      EZ        BWZ                     OPCODE     . SHDULD             1  03035  V
1266                DC     FB               I-ADDRESS  . NOT                5  03040  03054
1267                       GMbM             B-ADDRESS  . BRANCH             5  03045  09071
1268                       ¤¤¤              D-MODIFIER .                    1  03046
1269                B      *&2              SHOULD BRANCH                   7  03047  J 03055
1270      FB        H                                                       1  03054  .
1271      *
1272      * SUB-RTN 10.12   LONG ADD & SUBTRACT USING ALL DIGITS
1273      HO        ZS     &54321,WORK4-5   WORK4 SHOULD BE  5432J..... NOW  11  03055  . 09542 09166
1274                ZS     WORK4-5,WORK4    WORK4 SHDULD BE  000005432A NOW  11  03066  . 09166 09171
1275                A      &9876,WORK4-5    WORK4 SHOULD BE  098765432A NOW  11  03077  A 09546 09166
1276                A      &123,WORK4-5     WORK4 SHDULD BE  099995432A NOW  11  03088  A 09549 09166
1277                A      &45679,WORK4     WORK4 SHOULD BE  100000000& NOW  11  03099  A 09554 09171
1278                8Z     HP               SHOULD NOT BRANCH                7  03110  J 03219 V
1279                SW     WORK4-8                                          6  03117  , 09163
1280                ZS     WORK4            TEST LOWER 9 DDS OF WORK4 FOR ZRO  6  03123  . 09171
1281                CW     WORK4-8                                          6  03129  ¤ 09163
1282                BZ     *&8              SHDULD BRANCH                   7  03135  J 03149 V
1283                B      HP                                               7  03142  J 03219
1284                S      &123,WORK4-5     WORK4 SHOULD BE  098770000- NOW  11  03149  S 09549 09166
1285                S      -45679,WORK4     WORK4 SHDULD BE  098765432J NOW  11  03160  S 09559 09171
1286                S      &9876,WORK4-5    WORK4 SHDULD BE  000005432J NOW  11  03171  S 09546 09166
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PGLIN     LABEL        OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1287                   S      -54321,WORK4          WORK4 SHOULD BE  000000000- NOW  11  03182  S 09564 09171
1288                   BZ     *&8                   SHOULD BRANCH                 7  03193  J 03207 V
1289                   B      HP                                                  7  03200  J 03219
1290                   BZN    HQ,WORK4,-            WILL BRANCH IF ZONED CORRECTLY 12  03207  V 03220 09171 K
1291      HP           H                                                          1  03219  .
1292      * SUB-RTN 10.13  CK B-FIELD ZONE RETENTION & SIGN CHANGE
1293      HQ           SW     WORK5                 PROTECT HI-ORDER FIELD OF WORK5  6  03220  Q 09175
1294                   ZA     -1,WORK5              INSURE ZONED NEGATIVELY       11  03226  M 09565 09175
1295                   CW     WORK5                 REMOVE WM                     6  03237  u 09175
1296                   S      WORK5                 ZERO OUT WORK5 FIELD          6  03243  S 09175
1297                   BZN    *&8,WORK5,-           . INSURE                     12  03249  V 03268 09175 K
1298                   B      HR                    . THAT                        7  03261  J 03435
1299                   BZN    *&8,WORK5-1,*         . ZONES                      12  03268  V 03287 09174 S
1300                   B      HR                    . ARE                         7  03280  J 03435
1301                   BZN    *&8,WORK5-2,          . RETAINED                   12  03287  V 03306 09173 2
1302                   B      HR                    . FOLLOWING                   7  03299  J 03435
1303                   BZN    *&8,WORK5-3,&         . SINGLE-FIELD               12  03306  V 03325 09172 B
1304                   B      HR                    . SUBTRACT                    7  03318  J 03435
1305                   A      @9R1Y@,WORK5                                       11  03325  A 09569 09175
1306                   BZN    *&8,WORK5,&           . CHECK                      12  03336  V 03355 09175 B
1307                   B      HR                    . SIGN                        7  03348  J 03435
1308                   BZN    *&8,WORK5-1,*         . CHANGE                     12  03355  V 03374 09174 S
1309                   B      HR                    . AND                         7  03367  J 03435
1310                   BZN    *&8,WORK5-2,          . ZONE                       12  03374  V 03393 09173 2
1311                   B      HR                    . RETENTION                   7  03386  J 03435
1312                   BZN    *&8,WORK5-3,&         . FOLLOWING                  12  03393  V 03412 09172 B
1313                   B      HR                    . ADD                         7  03405  J 03435
1314                   S      FIVE9S-1,WCRK5        SHOULD CHANGE SIGN BACK TO MINUS 11  03412  S 09252 09175
1315                   BZN    *&2,WORK5,-           SHOULD BRANCH                12  03423  V 03436 09175 K
1316      HR           H                                                          1  03435  .
1317      ************************************************************************
1318      *
1319      * ROUTINE 11.00  CHECK OPERATION CLEAR STORAGE
1320      *
1321      * SUB-RTN 11.01  CK CS 0000C FOR NO ERR & PROPER SETTINGS AAR, BAR
```

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PGLIN  LABEL      OPCOD  OPERANC                                  CT  ADDRS  INSTRUCTION
1322   HW         CS     0                                         6  03436  / 00000
1323              SBR    HOLDB1-1                                  7  03442  G 09185 B
1324              SAR    HOLDA1                                    7  03449  G 09181 A
1325              A      &0,HOLDA1          CHECK SETTING OF AAR  11  03456  A 09570 09181
1326              BZ     *&8                SHOULD BRANCH         7  03467  J 03481 V
1327              B      HX                                        7  03474  J 03499
1328              S      FIVE9S,HOLDB1-1    CHECK SETTING BAR     11  03481  S 09253 09185
1329              BZ     HY                 SHOULD BRANCH         7  03492  J 03500 V
1330   HX         H                                                1  03499  .
1331   * SUB-RTN 11.02  CHECK PROPER OPERATION CLEAR STORAGE
1332   HY         SW     HZ&9               . INITIALIZE B-FIELD  6  03500  , 03671
1333              S      HZ&10              . OF BBE INSTRUCTION  6  03506  S 03672
1334              A      FIVE9S-3,HZ&10     . WHICH FOLLOWS      11  03512  A 09250 03672
1335              CW     HZ&9               .                     6  03523  ¤ 03671
1336              SW     201,251                                 11  03529  , 00201 00251
1337              CS     299                TRY TO CLEAR 00299 - 00200  6  03540  / 00299
1338              BW     JA,251             SHOULD NOT BRANCH    12  03546  V 03711 00251 1
1339              BW     JA,201             SHOULD NOT BRANCH    12  03558  V 03711 00201 1
1340              SW     201,301            PLACE TWO WMS        11  03570  , 00201 00301
1341              ZA     &7,201             PUT B-A-4-2-1 BITS IN LOC 00201  11  03581  OM 09571 00201
1342              ZA     &8,301                                  11  03592  OM 09572 00301
1343              CW     301,300                                 11  03603  ¤ 00301 00300
1344              ZA     301,300            FILL 00201 - 00299 WITH EIGHTS  11  03614  OM 00301 00300
1345              BBE    JA,201,G           SHOULD NOT BRANCH    12  03625  W 03711 00201 G
1346              BBE    *&8,201,8          SHOULD BRANCH        12  03637  W 03656 00201 8
1347              B      JA                                       7  03649  J 03711
1348              CS     299                TRY TO CLEAR THE EIGHTS  6  03656  / 00299
1349   HZ         88E    JA,299,GM          BRANCH IF ANY BITS AT ALL  12  03662  W 03711 00299 GM
1350              SW     HZ&9                                     6  03674  , 03671
1351              S      &1,HZ&10                                11  03680  S 09573 03672
1352              CW     HZ&9                                     6  03691  ¤ 03671
1353              BZ     JB                 LEAVE ROUTINE IF NO ERROR  7  03697  J 03712 V
1354              B      HZ                                       7  03704  J 03662
1355   JA         H                                               1  03711  .
1356   *
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PGLIN  LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1357   * SUB-RTN 11.03  CHECK CLEAR STORAGE & BRANCH
1358   *
1359   JB        SW     100              . PUT SOME DATA          6  03712  , 00100
1360             ZA     &7,100           . IN LOC 00100          11  03718  M 09571 00100
1361             CS     JD,100           CLEAR LOC 00100, SKIP NEXT INSTR  11  03729  / 03747 00100
1362   JC        B      JE                                        7  03740  J 03816
1363   JD        SAR    HOLDA1                                    7  03747  G 09181 A
1364             SBR    HOLDB1                                    7  03754  G 09186 B
1365             BBE    JE,100,M         SHOULD NOT BRANCH       12  03761  W 03816 00100 M
1366             S      &JC,HOLDA1                               11  03773  S 09578 09181
1367             BZ     *&8              SHOULD BRANCH            7  03784  J 03798 V
1368             B      JE                                        7  03791  J 03816
1369             S      &JC,HOLDB1                               11  03798  S 09583 09186
1370             BZ     JF               SHOULD EXIT HERE         7  03809  J 03817 V
1371   JE        H                                                1  03816  .
1372   ************************************************************
1373   *
1374   * ROUTINE 12.00  INITIALIZE PASS COUNT WORK AREA & LOCATION 00001
1375   *
1376   JF        NOPWM                                            1  03817  N
1377             B      *&18             SKIP NEXT TWO INSTRS WHEN SET  7  03818  J 03842
1378             SW     *-12                                      6  03825  , 03818
1379             ZA     PCC,PCCWK                                11  03831  M 09191 09196
1380             CS     99                                        6  03842  / 00099
1381             SW     1,8                                      11  03848  , 00001 00008
1382             A      &RESET,6                                 11  03859  A 09588 00006
1383             S      &1,1                                     11  03870  S 09573 00001
1384   ************************************************************
1385   *
1386   * ROUTINE 13.00  CHECK ADDRESSING BY INDEXING
1387   *
1388   * SUB-RTN 13.01
1389   JG        SW     X1-4             WM OVER HI-ORDER DIGIT IX REG 1  6  03881  , 00025
1390             ZA     *,X1                                     11  03887  M 03897 00029
1391             S      X1,0&X1          B-ADDR INDEXED BY IX REG 1  11  03898  S 00029 000#0
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PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND		CT	ADDRS	CC01 INSTRUCTION
1392		BZ	JH&X1	SHOULD BRANCH	7	03909	J 039J7 V
1393		H			1	03916	.
1394	* SUB-RTN 13.02						
1395	JH	SW	X2-4		6	03917	, 00030
1396		ZA	*,X2		11	03923	M 03933 00034
1397		S	X2,0&X2		11	03934	S 00034 000.0
1398		BZ	JI&X2	SHOULD BRANCH	7	03945	J 039N3 V
1399		H			1	03952	.
1400	* SUB-RTN 13.03						
1401	JI	SW	X3-4		6	03953	, 00035
1402		ZA	*,X3		11	03959	M 03969 00039
1403		S	X3,0&X3		11	03970	S 00039 000M0
1404		BZ	JJ&X3	SHOULD BRANCH	7	03981	J 039H9 V
1405		H			1	03988	.
1406	* SUB-RTN 13.04						
1407	JJ	SW	X4-4		6	03989	, 00040
1408		ZA	*,X4		11	03995	M 04005 00044
1409		S	X4,0&X4		11	04006	S 00044 00*00
1410		BZ	JK&X4	SHOULD BRANCH	7	04017	J 04*25 V
1411		H			1	04024	.
1412	* SUB-RTN 13.05						
1413	JK	SW	X5-4		6	04025	, 00045
1414		ZA	*,X5		11	04031	M 04041 00049
1415		S	X5,0&X5		11	04042	S 00049 00**0
1416		BZ	JL&X5	SHOULD BRANCH	7	04053	J 04*W1 V
1417		H			1	04060	.
1418	* SUB-RTN 13.06						
1419	JL	SW	X6-4		6	04061	, 00050
1420		ZA	*,X6		11	04067	M 04077 00054
1421		S	X6,0&X6		11	04078	S 00054 00*.0
1422		BZ	JM&X6	SHOULD BRANCH	7	04089	J 04*R7 V
1423		H			1	04096	.
1424	* SUB-RTN 13.07						
1425	JM	SW	X7-4		6	04097	, 00055
1426		ZA	*,X7		11	04103	M 04113 00059

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                    CC01  CPU TEST                                                    CC01
PGLIN     LABEL     OPCOD OPERAND                                    CT  ADDRS  INSTRUCTION
1427                S     X7,0&X7                                    11  04114  S 00059 00‡MQ0
1428                BZ    JN&X7          SHOULD BRANCH                7  04125  J 04/C3 V
1429                H                                                 1  04132  .
1430      * SUB-RTN 13.08
1431      JN        SW    X8-4                                       6  04133  , 00060
1432                ZA    *,X8                                      11  04139  MQ 04149 00064
1433                S     X8,0&X8                                   11  04150  S 00064 00'.00
1434                BZ    JP&X8          SHOULD BRANCH               7  04161  J 04J69 V
1435                H                                                 1  04168  .
1436      * SUB-RTN 13.09
1437      JP        SW    X9-4                                       6  04169  , 00065
1438                ZA    *,X9                                      11  04175  MQ 04185 00069
1439                S     X9,0&X9                                   11  04186  S 00069 00'.‡0
1440                BZ    JQ&X9          SHOULD BRANCH               7  04197  J 04K‡5 V
1441                H                                                 1  04204  .
1442      * SUB-RTN 13.10
1443      JQ        SW    X10-4                                      6  04205  , 00070
1444                ZA    *,X10                                     11  04211  MQ 04221 00074
1445                S     X10,0&X10                                 11  04222  S 00074 00''.0
1446                BZ    JR&X10         SHOULD BRANCH               7  04233  J 04KM1 V
1447                H                                                 1  04240  .
1448      * SUB-RTN 13.11
1449      JR        SW    X11-4                                      6  04241  , 00075
1450                ZA    *,X11                                     11  04247  MQ 04257 00079
1451                S     X11,0&X11                                 11  04258  S 00079 00'MQ0
1452                BZ    JS&X11         SHOULD BRANCH               7  04269  J 04KG7 V
1453                H                                                 1  04276  .
1454      * SUB-RTN 13.12
1455      JS        SW    X12-4                                      6  04277  , 00080
1456                ZA    *,X12                                     11  04283  MQ 04293 00084
1457                S     X12,0&X12                                 11  04294  S 00084 00MQ00
1458                BZ    JT&X12         SHOULD BRANCH               7  04305  J 04C13 V
1459                H                                                 1  04312  .
1460      * SUB-RTN 13.13
1461      JT        SW    X13-4                                      6  04313  , 00085
1462                ZA    *,X13                                     11  04319  MQ 04329 00089
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PGLIN  LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1463               S     X13,0&X13                                11  04330  S 00089 00M*0
1464               BZ    JU&X13              SHOULD BRANCH         7  04341  J 04CU9 V
1465               H                                             1  04348  .
1466   * SUB-RTN 13.14
1467   JU          SW    X14-4                                    6  04349  , 00090
1468               ZA    *,X14                                   11  04355  M 04365 00094
1469               S     X14,0&X14                               11  04366  S 00094 00M.0
1470               BZ    JV&X14              SHOULD BRANCH         7  04377  J 04CQ5 V
1471               H                                             1  04384  .
1472   * SUB-RTN 13.15
1473   JV          SW    X15-4                                    6  04385  , 00095
1474               ZA    *,X15                                   11  04391  M 04401 00099
1475               S     X15,0&X15                               11  04402  S 00099 00MM0
1476               BZ    KF01&X15            SHOULD BRANCH         7  04413  J 04DB1 V
1477               H                                             1  04420  .
1478   ************************************************************************
1479   *
1480   * ROUTINE 15.00   CHECK OPERATION OF BRANCH CHARACTER EQUAL
1481   *
1482   * SUB-RTN 15.01   COMPARE D-MOD 9 WITH B-FLD @ FOR LO COMPARE
1483   *                 ANC NO BRANCH.  CHECK AAR & BAR SETTINGS
1484   KF01        BCE   KF02,ATSIGN,9       SHOULD NOT BRANCH    12  04421  B 04504 09087 9
1485               SAR   HOLDA2                                    7  04433  G 09181 A
1486               SBR   HOLDB2                                    7  04440  G 09186 B
1487               BL    *&8                 SHOULD BRANCH         7  04447  J 04461 T
1488               B     KF02                                      7  04454  J 04504
1489               S     &KF02,HOLDA2                            11  04461  S 09593 09181
1490               BZ    *&8                 SHOULD BRANCH         7  04472  J 04486 V
1491               B     KF02                                      7  04479  J 04504
1492               S     &POUND,HOLDB2       ADDR OF POUND IS ADDR OF ATSIGN-1  11  04486  S 0959B 09186
1493               BZ    KF03                SHOULD BRANCH         7  04497  J 04505 V
1494   KF02        H                                             1  04504  .
1495   * SUB-RTN 15.02   COMPARE D-MOD AT SIGN WITH B-FLD NINE
1496   *                 FOR HI COMPARE AND NO BRANCH.
1497   KF03        BCE   KF04,NINE,@         SHOULD NOT BRANCH    12  04505  B 04538 09129 @
1498               BH    *&8                 SHOULD BRANCH         7  04517  J 04531 U
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1499                 B      *&8                                       7  04524  J 04538
1500                 BF     KFC5                SHOULD BRANCH         7  04531  J 04539 U
1501      KF04       H                                                1  04538  .
1502      * SUB-RTN 15.03   COMPARE D-MOD AMPERSAND W/B-FLD AMPERSAND FOR
1503      *                 EQ COMPARE AND BRANCH.  CHECK AAR & BAR SETTINGS
1504      KF05       BCE    KF07,AMPSND,&       SHOULD BRANCH        12  04539  B 04558 09072 &
1505      KF06       B      KF08                                      7  04551  J 04636
1506      KF07       SAR    HOLDA2                                    7  04558  G 09181 A
1507                 SBR    HOLDB2                                    7  04565  G 09186 B
1508                 BU     KF08                SHOULD NOT BRANCH     7  04572  J 04636 /
1509                 BE     *&8                 SHOULD BRANCH         7  04579  J 04593 S
1510                 B      KFC8                                      7  04586  J 04636
1511                 S      &KF07,HOLDA2                             11  04593  S 09603 09181
1512                 BZ     *&8                                       7  04604  J 04618 V
1513                 B      KFC8                                      7  04611  J 04636
1514                 S      &KF06,HOLDB2                             11  04618  S 09608 09186
1515                 BZ     KG                  SHOULD BRANCH & EXIT  7  04629  J 04637 V
1516      KF08       H                                                1  04636  .
1517      ************************************************************************
1518      *
1519      * ROUTINE 16.00   CHECK CERTAIN MOVE OPCODES PREPARATORY TO COMPARE
1520      *
1521      * SUB-RTN 16.01   CHECK SCNLS FOR STEPPING AAR, BAR ONE POSITION
1522      KG         CS     103                                       6  04637  / 00103
1523                 SCNLS  102,103                                  12  04643  D 00102 00103
1524                 SAR    HOLDA2                                    7  04655  G 09181 A
1525                 SBR    HOLDB2                                    7  04662  G 09186 B
1526                 S      @0C101@,HOLDA2                           11  04669  S 09613 09181
1527                 BZ     *&8                 SHOULD BRANCH         7  04680  J 04694 V
1528                 B      KH                                        7  04687  J 04712
1529                 S      @0C102@,HOLDB2                           11  04694  S 09618 09186
1530                 BZ     K1                  SHOULD BRANCH         7  04705  J 04713 V
1531      KH         H                                                1  04712  .
1532      * SUB-RTN 16.02   CHECK MLNS FOR CORRECT OPERATION
1533      K1         CS     101                                       6  04713  / 00101
1534                 SW     10C                                       6  04719  , 00100
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  AOORS  INSTRUCTION
1535                 ZA     MINUS7,101        PUT 8-4-2-1 BITS IN LOC 00101  11  04725  M 09108 00101
1536                 MLNS   WYE,101                                  12  04736  D 09118 00101 1
1537                 88E    KJ,101,X          SHOULD NOT BRANCH      12  04748  W 04803 00101 X
1538                 BW     KJ,101            SHOULD NOT BRANCH      12  04760  V 04803 00101 1
1539                 88E    *&8,101,-         SHOULD BRANCH          12  04772  W 04791 00101 -
1540                 B      KJ                                       7  04784  J 04803
1541                 88E    KK,101,8          EXIT HERE              12  04791  W 04804 00101 8
1542      KJ         H                                               1  04803  .
1543      * SUB-RTN 16.03   CHECK MLZS FOR CORRECT OPERATION
1544      KK         CS     101                                      6  04804  / 00101
1545                 SW     100                                      6  04810  , 00100
1546                 ZA     MINUS8,101        PUT 8-8 BITS IN LOC 00101  11  04816  M 09109 00101
1547                 MLZS   EKS,101                                  12  04827  D 09117 00101 2
1548                 88E    KL,101,P          SHOULD NOT BRANCH      12  04839  W 04894 00101 P
1549                 BW     KL,101            SHOULD NOT BRANCH      12  04851  V 04894 00101 1
1550                 88E    *&8,101,8         SHOULD BRANCH          12  04863  W 04882 00101 8
1551                 B      KL                                       7  04875  J 04894
1552                 88E    KM,101,*                                 12  04882  W 04895 00101 *
1553      KL         H                                               1  04894  .
1554      * SUB-RTN 16.04   CHECK MLCS FOR CORRECT OPERATION
1555      KM         CS     101                                      6  04895  / 00101
1556                 SW     10C                                      6  04901  , 00100
1557                 ZA     MINUS0,101        PUT 8-8-2 BITS IN LOC 00101  11  04907  M 09101 00101
1558                 MLCS   VEE,101                                  12  04918  D 09115 00101 3
1559                 BW     KN,101            SHOULD NOT BRANCH      12  04930  V 05004 00101 1
1560                 88E    KN,101,'          SHOULD NOT BRANCH      12  04942  W 05004 00101 '
1561                 88E    *&8,101,1         SHOULD BRANCH          12  04954  W 04973 00101 1
1562                 B      KN                                       7  04966  J 05004
1563                 88E    *&8,101,4         SHOULD BRANCH          12  04973  W 04992 00101 4
1564                 B      KN                                       7  04985  J 05004
1565                 88E    KR,101,*          SHOULD EXIT HERE       12  04992  W 05005 00101 *
1566      KN         H                                               1  05004  .
1567      **********************************************************************
1568      *
1569      * ROUTINE 17.00   CHECK COMPARE OPCOD USING SINGLE CHARACTERS
1570      *
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PGLIN     LABEL      OPCOD  OPERANO                                    CT  ADORS  INSTRUCTION
1571      *                 THIS ROUTINE COMPARES ALL SIXTY-FOUR LEGITIMATE
1572      *                 CHARACTERS WITH ONE ANOTHER AND INSURES THAT ALL
1573      *                 IDENTICAL CHARACTERS COMPARE EQUAL, THAT NO
1574      *                 CHARACTER COMPARES EQUAL TO ANY CHARACTER EXCEPT
1575      *                 ITSELF, AND THAT THE COLLATING SEQUENCE IS PROPER
1576      *
1577      *                 BEGIN BY USING SIMPLEST COMPARISONS TO VERIFY
1578      *                 CORRECT OPERATION OF BRANCH HI, LO, EQ, UNEQUAL
1579      *
1580      * SUB-RTN 17.01   COMPARE A-FLD 9 WITH B-FLD @ FOR LO COMPARE
1581      KR          C     NINE,ATSIGN                                11  05005  C 09129 09087
1582                  BE    KS                  SHOULD NOT BRANCH       7  05016  J 05051 S
1583                  BU    *&8                 SHOULD BRANCH           7  05023  J 05037 /
1584                  B     KS                                          7  05030  J 05051
1585                  BH    *&8                 SHOULD NOT BRANCH       7  05037  J 05051 U
1586                  BL    KT                  SHOULD BRANCH           7  05044  J 05052 T
1587      KS          H                                                 1  05051  *
1588      * SUB-RTN 17.02   COMPARE A-FLD @ WITH B-FLD 9 FOR HI COMPARE
1589      KT          C     ATSIGN,NINE                                11  05052  C 09087 09129
1590                  BE    KU                  SHOULD NOT BRANCH       7  05063  J 05098 S
1591                  BU    *&8                 SHOULD BRANCH           7  05070  J 05084 /
1592                  B     KU                                          7  05077  J 05098
1593                  BL    KU                  SHOULD NOT BRANCH       7  05084  J 05098 T
1594                  BH    KV                  SHOULD BRANCH           7  05091  J 05099 U
1595      KU          H                                                 1  05098  *
1596      * SUB-RTN 17.03   COMPARE AMPERSAND WITH AMPERSAND FOR EQ COMPARE
1597      KV          C     AMPSNO,AMPSND                              11  05099  C 09072 09072
1598                  BU    KW                  SHOULD                  7  05110  J 05138 /
1599                  BH    KW                   NOT                    7  05117  J 05138 U
1600                  BL    KW                     BRANCH               7  05124  J 05138 T
1601                  BE    *&2                 SHOULD BRANCH           7  05131  J 05139 S
1602      KW          H                                                 1  05138  *
1603      ************************************************************************
1604      * ROUTINE 19.00   CHECK OPERATION OF DATA MOVE INSTRUCTION
1605      *
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PGLIN     LABEL      OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION

1606      * SUB-RTN 19.01   CHECK SCNLS FOR MOVE NO DATA
1607      LK         MLCS   NWM63,WORK6                                12  05139  D 09064 09176 3
1608                 SW     WORK6                                      6  05151  , 09176
1609                 SCNLS  NWM00,WORK6                                12  05157  D 09002 09176
1610                 C      ALL8IT,WORK6                               11  05169  C 09071 09176
1611                 BE     LL                 SHOULD BRANCH           7  05180  J 05188 S
1612                 H                                                 1  05187  .
1613      * SUB-RTN 19.02   CHECK MLNS FOR MOVE NUMERIC, NO ZONES, NO WM
1614      LL         MLCS   NWM62,WORK6                                12  05188  D 09063 09176 3
1615                 SW     WORK6                                      6  05200  , 09176
1616                 MLNS   NWM01,WORK6                                12  05206  D 09003 09176 1
1617                 C      AYE,WORK6                                  11  05218  C 09092 09176
1618                 BE     LM                 SHOULD BRANCH           7  05229  J 05237 S
1619                 H                                                 1  05236  .
1620      * SUB-RTN 19.03   CHECK MLZS FOR MOVE ZONES, NO NUMERIC, NO WM
1621      LM         MLCS   NWM31,WORK6                                12  05237  D 09032 09176 3
1622                 SW     WORK6                                      6  05249  , 09176
1623                 MLZS   NWM32,WORK6                                12  05255  D 09033 09176 2
1624                 C      DELTA,WORK6                                11  05267  C 09077 09176
1625                 BE     LN                 SHOULD BRANCH           7  05278  J 05286 S
1626                 H                                                 1  05285  .
1627      * SUB-RTN 19.04   CHECK MLCS FOR MOVE NUMERIC, ZONE, NO WM
1628      LN         MLNS   NWM25,WORK6                                12  05286  D 09027 09176 1
1629                 MLZS   NWM25,WORK6                                12  05298  D 09027 09176 2
1630                 SW     WORK6                                      6  05310  , 09176
1631                 MLCS   NWM38,WORK6                                12  05316  D 09039 09176 3
1632                 C      OH,WORK6                                   11  05328  C 09107 09176
1633                 BE     LP                 SHOULD BRANCH           7  05339  J 05347 S
1634                 H                                                 1  05346  .
1635      * SUB-RTN 19.05   CHECK MLWS FOR MOVE WM, NO ZONE, NO NUMERIC
1636      LP         MLCS   NWM63,WORK6                                12  05347  D 09064 09176 3
1637                 CW     WORK6                                      6  05359  ¤ 09176
1638                 MLWS   BLANK,WORK6                                12  05365  D 09066 09176 4
1639                 C      ALL8IT,WORK6                               11  05377  C 09071 09176
1640                 BE     LQ                 SHOULD BRANCH           7  05388  J 05396 S
1641                 H                                                 1  05395  .
1642      * SUB-RTN 19.06   CHECK MLNWS FOR MOVE NUMERIC, WM, NO ZONE
1643      LQ         MLCS   NWM54 WORK6                                12  05396  D 09056 09176 3
1644                 A      WORK6                                      6  0 08   . 0917.
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1645                MLNWS   NINE,WORK6                                      12  05414  D 09129 09176 5
1646                C       EYE,WORK6                                       11  05426  C 09100 09176
1647                BE      LR                  SHOULD BRANCH                7  05437  J 05445 S
1648                H                                                        1  05444  .
1649      * SUB-RTN 19.07   CHECK MLZWS FOR MOVE ZONE, WM, NO NUMERIC
1650      LR        MLCS    NWM31,WORK6                                     12  05445  D 09032 09176 3
1651                CW      WORK6                                            6  05457  ¤ 09176
1652                MLZWS   DASH,WORK6                                      12  05463  D 09078 09176 6
1653                C       DELTA,WORK6                                     11  05475  C 09077 09176
1654                BE      LS                  SHOULO BRANCH                7  05486  J 05494 S
1655                H                                                        1  05493  .
1656      * SUB-RTN 19.08   CHECK MLCWS FOR MOVE CHARACTER AND WORO MARK
1657      LS        MLCS    NWM00,WORK6                                     12  05494  D 09002 09176 3
1658                CW      WORK6                                            6  05506  ¤ 09176
1659                MLCWS   ALLBIT,WORK6                                    12  05512  D 09071 09176 7
1660                C       ALLBIT,WORK6                                    11  05524  C 09071 09176
1661                BE      LT                  SHOULO BRANCH                7  05535  J 05543 S
1662                H                                                        1  05542  .
1663      * SUB-RTN 19.09   CHECK SCNR FOR MOVE NO DATA, PROPER ADDR REG STEP
1664      LT        MLCWS   NWM63,100                                       12  05543  O 09064 00100 7
1665                MLCWS   BLANK,101                                       12  05555  D 09066 00101 7
1666                SCNR    10C,101                                         12  05567  D 00100 00101 8
1667                SAR     HOLDA2                                           7  05579  G 09181 A
1668                SBR     HOLDB2                                           7  05586  G 09186 B
1669                C       HOLDA2,@001010      CK AAR FOR PROPER STEPPING  11  05593  C 09181 09613
1670                BU      LU                  SHOULD NOT BRANCH            7  05604  J 05709 /
1671                C       HOLDB2,@001020      CK BAR FOR PROPER STEPPING  11  05611  C 09186 09618
1672                BU      LU                  SHOULD NOT BRANCH            7  05622  J 05709 /
1673                C       BLANK,101           TEST LOC 00101 FOR WM-BLANK 11  05629  C 09066 00101
1674                BU      LU                  SHOULD NOT BRANCH            7  05640  J 05709 /
1675                SCNR    101,100                                         12  05647  D 00101 00100 8
1676                SAR     HOLDA2                                           7  05659  G 09181 A
1677                SBR     HOLDB2                                           7  05666  G 09186 B
1678                C       HOLDA2,@001020      CK AAR FOR PROPER STEPPING  11  05673  C 09181 09618
1679                BU      LU                  SHOULO NOT BRANCH            7  05684  J 05709 /
1680                C       HOLDB2,@001010      CK BAR FOR PROPER STEPPING  11  05691  C 09186 09613
1681                BE      LV                  SHOULD BRANCH & EXIT         7  05702  J 05710 S
1682      LU        H                                                        1  05709  .
1683      * SUB-RTN 19.10   CHECK MRN SIMILAR TO MLNS
1684      LV        MLCWS   NWM50,WORK6                                     12  05710  O 09051 09176 7
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PGLIN	LABEL	CC01 OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
1685		MRN	COLON,WORK6		12	05722	D 09088 09176 9
1686		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05734	V 05758 09176 1
1687		BCE	LW,WORK6,8		12	05746	B 05759 09176 B
1688		H			1	05758	.
1689	* SUB-RTN 19.11		CHECK MRZ				
1690	LW	MLCWS	NWM47,WORK6		12	05759	D 09048 09176 7
1691		MRZ	SUBLNK,WORK6		12	05771	D 09085 09176 0
1692		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05783	V 05807 09176 1
1693		BCE	LX,WORK6,M		12	05795	B 05808 09176 M
1694		H			1	05807	.
1695	* SUB-RTN 19.12		CHECK MRC				
1696	LX	MLCWS	NWM12,WORK6		12	05808	D 09014 09176 7
1697		MRC	SEE,WORK6		12	05820	D 09094 09176 #
1698		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05832	V 05856 09176 1
1699		BCE	LY,WORK6,C	SHOULD BRANCH	12	05844	B 05857 09176 C
1700		H			1	05856	.
1701	* SUB-RTN 19.13		CHECK MRW				
1702	LY	MLCWS	ALLBIT,WORK6		12	05857	D 09071 09176 7
1703		MRW	NWM00,WORK6		12	05869	D 09002 09176 @
1704		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05881	V 05905 09176 1
1705		BCE	LZ,WORK6,M		12	05893	B 05906 09176 M
1706		H			1	05905	.
1707	* SUB-RTN 19.14		CHECK MRNW				
1708	LZ	MLCWS	QUESTN,WORK6		12	05906	D 09091 09176 7
1709		MRNW	NWM05,WORK6		12	05918	D 09007 09176 .
1710		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05930	V 05954 09176 1
1711		BCE	MA,WORK6,E	SHOULD BRANCH	12	05942	B 05955 09176 E
1712		H			1	05954	.
1713	* SUB-RTN 19.15		CHECK MRZW				
1714	MA	MLCWS	TPMARK,WORK6		12	05955	D 09090 09176 7
1715		MRZW	NWM48,WORK6		12	05967	D 09049 09176 T
1716		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05979	V 06003 09176 1
1717		BCE	MB,WORK6,M		12	05991	B 06004 09176 M
1718		H			1	06003	.
1719	* SUB-RTN 19.16		CHECK MRCW				

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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1720      MB         MLCWS  EMM,WORK6                                        12  06004  D 09105 09176 7
                                                                                                      T
1721                 MRCW   NWM27,WORK6                                      12  06016  D 09028 09176 M
1722                 BW     *&13,WORK6          SHOULD NOT BRANCH            12  06028  V 06052 09176 1
1723                 BCE    MC,WORK6,,          SHOULD BRANCH                12  06040  B 06053 09176 ,
1724                 H                                                        1  06052  .
1725      * SUB-RTN 19.17    CHECK SCNLA FOR MOVE NO DATA, PROPER ADDR REG STP
1726      MC         MLCWS  LBRAKT,102                                       12  06053  D 09069 00102 7
1727                 MLCWS  NWM02,103                                        12  06065  D 09004 00103 7
1728                 MLCWS  LBRAKT,104                                       12  06077  D 09069 00104 7
                                                                                                      S
1729                 SCNLA  103,104                                         12  06089  D 00103 00104 B
1730                 SAR    HOLDA2                                           7  06101  G 09181 A
1731                 SBR    HOLDB2                                           7  06108  G 09186 B
1732                 C      HOLDA2,@001018      CHECK AAR FOR PROPER STEPPING 11  06115  C 09181 09613
1733                 BU     MD                  SHOULD NOT BRANCH             7  06126  J 06169 /
1734                 C      HOLDB2,@001028      CHECK BAR FOR PROPER STEPPING 11  06133  C 09186 09618
1735                 BU     MD                  SHOULD NOT BRANCH             7  06144  J 06169 /
1736                 C      NWM61,104           TEST THAT NO DATA WERE MOVED  11  06151  C 09062 00104
1737                 BE     ME                  SHOULD BRANCH & EXIT          7  06162  J 06170 S
1738      MD         H                                                        1  06169  .
1739      * SUB-RTN 19.18    CHECK MLNA
1740      ME         MLCWS  DELTA,102                                        12  06170  D 09077 00102 7
1741                 MLCWS  NWM16,103                                        12  06182  D 09018 00103 7
1742                 MLCWS  DELTA,104                                        12  06194  D 09077 00104 7
1743                 MLNA   103,104                                         12  06206  D 00103 00104 /
1744                 C      NWM32,104                                       11  06218  C 09033 00104
1745                 BE     MF                  SHOULD BRANCH & EXIT          7  06229  J 06237 S
1746                 H                                                        1  06236  .
1747      * SUB-RTN 19.19    CHECK MLZA
1748      MF         MLCWS  PERCNT,102                                       12  06237  D 09081 00102 7
1749                 MLCWS  NWM35,103                                        12  06249  D 09036 00103 7
1750                 MLCWS  PERCNT,104                                       12  06261  D 09081 00104 7
1751                 MLZA   103,104                                         12  06273  D 00103 00104 S
1752                 C      NWM44,104                                       11  06285  C 09045 00104
1753                 BE     MG                  SHOULD BRANCH & EXIT          7  06296  J 06304 S
1754                 H                                                        1  06303  .
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
1755	* SUB-RTN 19.20		CHECK MLCA				
1756	MG	MLCWS	NWM63,WORK6		12	06304	O 09064 09176 7
1757		MLCA	BLANK,WORK6		12	06316	D 09066 09176 T
1758		BW	*&13,WORK6	SHOULO NOT BRANCH	12	06328	V 06352 09176 1
1759		BCE	MH,WORK6,	SHOULO BRANCH	12	06340	B 06353 09176
1760		H			1	06352	.
1761	* SUB-RTN 19.21		CHECK MLWA				
1762	MH	MLCWS	NWM53,WORK6		12	06353	O 09054 09176 7
1763		MLWA	NAUGHT,WORK6		12	06365	O 09120 09176 U
1764		C	NWM53,WORK6		11	06377	C 09054 09176
1765		BE	MI	SHOULO BRANCH	7	06388	J 06396 S
1766		H			1	06395	.
1767	* SUB-RTN 19.22		CHECK MLNWA				
1768	MI	MLCWS	NWM47,WORK6		12	06396	O 09048 09176 7
1769		MLNWA	SUBLNK,WORK6		12	06408	D 09085 09176 V
1770		C	NWM32,WORK6		11	06420	C 09033 09176
1771		BE	MJ	SHOULO BRANCH	7	06431	J 06439 S
1772		H			1	06438	.
1773	* SUB-RTN 19.23		CHECK MLZWA				
1774	MJ	MLCWS	NWM03,WORK6		12	06439	D 09005 09176 7
1775		MLZWA	LOZNGE,WORK6		12	06451	D 09068 09176 W
1776		C	NWM51,WORK6		11	06463	C 09052 09176
1777		BE	MK	SHOULO BRANCH	7	06474	J 06482 S
1778		H			1	06481	.
1779	* SUB-RTN 19.24		CHECK MLCWA				
1780	MK	MLCWS	ALLBIT,102		12	06482	D 09071 00102 7
1781		MLCWS	NWM00,103		12	06494	O 09002 00103 7
1782		MLCWS	ALLBIT,104		12	06506	D 09071 00104 7
1783		MLCWA	103,104		12	06518	D 00103 00104 X
1784		BW	*&13,104	SHOULD NOT BRANCH	12	06530	V 06554 00104 1
1785		BCE	ML,104,	SHOULO BRANCH	12	06542	B 06555 00104
1786		H			1	06554	.
1787	* SUB-RTN 19.25		CHECK SCNRR FOR MOVE NO DATA, PROPER ADDR REG STP				
1788	ML	MLCWA	NWM26,101		12	06555	D 09065 00101 X
1789		MLCWS	GREATR,37		12	06567	D 09089 00037 7

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PGLIN     LABEL       OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1790                  MLCWS  NWM49,36                                 12  06579  D 09050 00036 7
1791                  SCNRR  37,36                                    12  06591  D 00037 00036 Y
1792                  SAR    HOLDA2                                    7  06603  G 09181 A
1793                  S8R    HOLDB2                                    7  06610  G 09186 B
1794                  C      HOLDA2,@001020      CHECK AAR FOR PROPER STEPPING 11  06617  C 09181 09618
1795                  BU     MM                  SHOULD NOT BRANCH     7  06628  J 06677 /
1796                  C      HOLDB2,@001010      CHECK BAR FOR PROPER STEPPING 11  06635  C 09186 09613
1797                  BU     MM                  SHOULD NOT BRANCH     7  06646  J 06677 /
1798                  SW     38                                        6  06653  , 00038
1799                  C      NWM26,101           TEST THAT NO DATA WERE MOVED 11  06659  C 09065 00101
1800                  BE     MN                  SHOULD BRANCH & EXIT  7  06670  J 06678 S
1801      MM          H                                                1  06677  .
1802      * SUB-RTN 19.26    CHECK MRNR
1803      MN          CW     100                                       6  06678  ¤ 00100
1804                  MRCW   K01,100                                   12  06684  D 09130 00100 T M
1805                  MRNR   K02,100                                   12  06696  D 09132 00100 Z
1806                  BW     MP,100              SHOULD NOT BRANCH     12  06708  V 06770 00100 1
1807                  BW     *&8,101             SHOULD BRANCH         12  06720  V 06739 00101 1
1808                  B      MP                                        7  06732  J 06770
1809                  BCE    *&8,100,            SHOULD BRANCH         12  06739  B 06758 00100
1810                  B      MP                                        7  06751  J 06770
1811                  BCE    MQ,101,!            SHOULD BRANCH & EXIT  12  06758  B 06771 00101 !
1812      MP          H                                                1  06770  .
1813      * SUB-RTN 19.27    CHECK MRZR
1814      MQ          CW     100                                       6  06771  ¤ 00100
1815                  MRCW   K03,100                                   12  06777  D 09134 00100 T M
1816                  MRZR   K04,100                                   12  06789  D 09136 00100 ‡
1817                  BW     MR,100              SHOULD NOT BRANCH     12  06801  V 06863 00100 1
1818                  BW     *&8,101             SHOULD BRANCH         12  06813  V 06832 00101 1
1819                  B      MR                                        7  06825  J 06863
1820                  BCE    *&8,100,-           SHOULD BRANCH         12  06832  B 06851 00100 -
1821                  B      MR                                        7  06844  J 06863
1822                  BCE    MS,101,V            SHOULD BRANCH & EXIT  12  06851  B 06864 00101 V
1823      MR          H                                                1  06863  .
1824      * SUB-RTN 19.28    CHECK MRCR
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PGLIN   LABEL      OPCOD  OPERAND                                  CT  AODRS  INSTRUCTION
1825    MS         MLCWA  K05,101                                  12  06864  D 09139 00101 X
1826               MRCR   K06,100                                  12  06876  D 09140 00100 ,
1827               BW     *&8,100          SHOULD BRANCH           12  06888  V 06907 00100 1
1828               B      MT                                        7  06900  J 06925
1829               C      101,K14&1                                11  06907  C 00101 09157
1830               BE     MU               SHOULD BRANCH & EXIT     7  06918  J 06926 S
1831    MT         H                                                1  06925  .
1832    * SUB-RTN 19.29   CHECK MRWR
1833    MU         MLCWA  K07,101                                  12  06926  D 09143 00101 X
1834               MRWR   K08,100                                  12  06938  D 09144 00100 %
1835               BW     MV,100           SHOULD NOT BRANCH       12  06950  V 07012 00100 1
1836               BW     *&8,101          SHOULD BRANCH           12  06962  V 06981 00101 1
1837               B      MV                                        7  06974  J 07012
1838               BCE    *&8,100,1        SHOULD BRANCH           12  06981  B 07000 00100 1
1839               B      MV                                        7  06993  J 07012
1840               BCE    MW,101,N         SHOULD BRANCH & EXIT    12  07000  B 07013 00101 N
1841    MV         H                                                1  07012  .
1842    * SUB-RTN 19.30   CHECK MRNWR
1843    MW         MLCWA  K09,101                                  12  07013  D 09147 00101 X
1844               MRNWR  K1C,100                                  12  07025  D 09148 00100 W S
1845               BW     MX,100           SHOULD NOT BRANCH       12  07037  V 07099 00100 1
1846               BW     *&8,101          SHOULD BRANCH           12  07049  V 07068 00101 1
1847               B      MX                                        7  07061  J 07099
1848               BCE    *&8,100,BS       SHOULD BRANCH           12  07068  B 07087 00100 S B
1849               B      MX                                        7  07080  J 07099
1850               BCE    MY,101,.         .                       12  07087  B 07100 00101 .
1851    MX         H                                                1  07099  .
1852    * SUB-RTN 19.31   CHECK MRZWR
1853    MY         MLCWA  K11,101                                  12  07100  D 09151 00101 X
1854               MRZWR  K12,100                                  12  07112  D 09152 00100 B S
1855               BW     MZ,100           SHOULD NOT BRANCH       12  07124  V 07186 00100 1
1856               BW     *&8,101          SHOULD BRANCH           12  07136  V 07155 00101 1
1857               B      MZ                                        7  07148  J 07186
1858               BCE    *&8,100,X        SHOULD BRANCH           12  07155  B 07174 00100 X
1859               B      MZ                                        7  07167  J 07186
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PGLIN   LABEL      OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1860               BCE    NA,101,V          SHOULD BRANCH & EXIT   12  07174  B 07187 00101 V
1861    PZ         H                                           1  07186  .
1862    * SUB-RTN 19.32   CHECK MRCWR
1863    NA         CW     100                                  6  07187  ¤ 00100
1864               MRCW   K13,100                             12  07193  D 09154 00100 M
1865               MRCWR  K14,100                             12  07205  D 09156 00100 M
1866               BW     *+8,100            SHOULD BRANCH   12  07217  V 07236 00100 1
1867               B      NB                                  7  07229  J 07254
1868               C      101,K1481                          11  07236  C 00101 09157
1869               BE     NC                 SHOULD BRANCH & EXIT   7  07247  J 07255 S
1870    NB         H                                           1  07254  .
1871    * SUB-RTN 19.33   CHECK SCNLB FOR MOVE NO DATA, PROPER ADDR REG STP
1872    NC         MLCWS  TPMARK,102                          12  07255  D 09090 00102 7
1873               MLCWS  NWM48,103                           12  07267  D 09049 00103 7
1874               MLCWS  AMPSND,104                          12  07279  D 09072 00104 7
1875               SCNLB  104,103                             12  07291  D 00104 00103 -
1876               SAR    HOLDA2                               7  07303  G 09181 A
1877               SBR    HOLDB2                               7  07310  G 09186 B
1878               C      HOLDA2,@00102@                      11  07317  C 09181 09618
1879               BU     ND                 SHOULD NOT BRANCH   7  07328  J 07371 /
1880               C      HOLDB2,@00101@                      11  07335  C 09186 09613
1881               BU     ND                 SHOULD NOT BRANCH   7  07346  J 07371 /
1882               C      NWM15,102          TEST THAT NO DATA WERE MOVED   11  07353  C 09017 00102
1883               BE     NE                 SHOULD BRANCH & EXIT   7  07364  J 07372 S
1884    ND         H                                           1  07371  .
1885    * SUB-RTN 19.34   CHECK MLNB
1886    NE         MLCWS  BKSLSH,WORK6                        12  07372  D 09083 09176 7
1887               MLNB   NWM33,WORK6                         12  07384  D 09034 09176 J
1888               C      NWM17,WORK6                         11  07396  C 09019 09176
1889               BE     NF                 SHOULD BRANCH    7  07407  J 07415 S
1890               H                                           1  07414  .
1891    * SUB-RTN 19.35   CHECK MLZB
1892    NF         SW     100                                  6  07415  , 00100
1893               MLCWS  NWM63,101                          12  07421  D 09064 00101 7
1894               MLZB   BLANK,101                          12  07433  D 09066 00101 K
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PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND		CT	ADDRS	CC01 INSTRUCTION
1895		BW	*&13,101	SHOULD NOT BRANCH	12	07445	V 07469 00101 1
1896		BCE	NG,101,M		12	07457	B 07470 00101 M
1897		H			1	07469	.
1898	* SUB-RTN	19.36	CHECK MLCB				
1899	NG	SW	10C		6	07470	, 00100
1900		MLCWS	NWM52,101		12	07476	D 09053 00101 7
1901		MLCB	POUNO,101		12	07488	D 09086 00101 L
1902		BW	*&13,101	SHOULO NOT BRANCH	12	07500	V 07524 00101 1
1903		BCE	NH,101,#		12	07512	B 07525 00101 #
1904		H			1	07524	.
1905	* SUB-RTN	19.37	CHECK MLWB				
1906	NH	SW	10C		6	07525	, 00100
1907		MLCWS	NWM15,101		12	07531	D 09017 00101 7
1908		MLWB	AMPSNO,101		12	07543	D 09072 00101 M
1909		C	NWM15,101		11	07555	C 09017 00101
1910		BE	NI	SHOULD BRANCH	7	07566	J 07574 S
1911		H			1	07573	.
1912	*SUB-RTN	19.38	CHECK MLNWB				
1913	NI	SW	10C		6	07574	, 00100
1914		MLCWS	NWM06,101		12	07580	D 09008 00101 7
1915		MLNWB	EYE,101		12	07592	D 09100 00101 N
1916		C	NWM09,101		11	07604	C 09011 00101
1917		8E	NJ	SHOULD 8RANCH	7	07615	J 07623 S
1918		H			1	07622	.
1919	* SUB-RTN	19.39	CHECK MLZWB				
1920	NJ	MLCWS	ALL8IT,WORK6		12	07623	D 09071 09176 7
1921		MLZWB	NWM00,WORK6		12	07635	D 09002 09176 0
1922		BW	*&13,WORK6	SHOULO NOT 8RANCH	12	07647	V 07671 09176 1
1923		BCE	NK,WORK6,M		12	07659	B 07672 09176 M
1924		H			1	07671	.
1925	* SUB-RTN	19.40	CHECK MLCW8				
1926	NK	MLCWS	LOZNGE,WORK6		12	07672	D 09068 09176 7
1927		MLCWB	NWM03,WORK6		12	07684	D 09005 09176 P
1928		BW	*&13,WORK6	SHOULD NOT BRANCH	12	07696	V 07720 09176 1
1929		8CE	NL,WORK6,3	SHOULO BRANCH	12	07708	B 07721 09176 3

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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1930                 H                                                        1  07720  .
1931      * SUB-RTN 19.41   CHECK SCNRG FOR MOVE NO DATA, PROPER ADDR REG STP
1932      NL         CS     164                INSURE 00100-00164 BLANK      6  07721  / 00164
1933                 MLCWS  ALLBIT,101         PUT TERMINAL CHARACTER IN 00101 12 07727  D 09071 00101 7
1934                 MLWA   164,100            INSURE NO WMS 00038-00100    12  07739  D 00164 00100 U
1935                 MLCWB  NINE,100           MOVE 64 CHARACTERS TO 00037-00100 12 07751 D 09129 00100 P
1936                 CW     42                 REMOVE WM FROM GROUP MARK     6  07763  ¤ 00042
1937                 SCNRG  37,36              TRY THE SCAN                 12  07769  D 00037 00036 Q
1938                 SAR    HOLDA2                                           7  07781  G 09181 A
1939                 SBR    HOLDB2                                           7  07788  G 09186 B
1940                 C      HOLDA2,@00102@     CHECK AAR FOR PROPER SETTING 11  07795  C 09181 09618
1941                 BU     NM                 SHOULD NOT BRANCH             7  07806  J 07885 /
1942                 C      HOLDB2,@00101@     CHECK BAR FOR PROPER SETTING  11  07813  C 09186 09613
1943                 BU     NM                 SHOULD NOT BRANCH             7  07824  J 07885 /
1944                 BW     NM,42              SHOULD NOT BRANCH            12  07831  V 07885 00042 1
1945                 MLWA   164,100            REMOVE ALL WMS FROM 00038-00100 12 07843 0 00164 00100 U
1946                 MLCB   NINE,164           MOVE 64 CHARACTERS TO 00101-00164 12 07855 D 09129 00164 L
1947                 C      100,164            CHECK THAT SCAN MOVED NO DATA 11 07867  C 00100 00164
1948                 BE     NN                 SHOULD BRANCH                 7  07878  J 07886 S
1949      NM         H                                                        1  07885  .
1950      * SUB-RTN 19.42   CHECK MRNG
1951      NN         MLCWS  NWM19,101                                       12  07886  D 09021 00101 7
1952                 MLCWS  SPLAT,102                                       12  07898  D 09074 00102 7
1953                 MLCWS  ALLBIT,103                                      12  07910  D 09071 00103 7
1954                 MRNG   102,101                                         12  07922  D 00102 00101 R
1955                 BW     *&13,101           SHOULD NOT BRANCH            12  07934  V 07958 00101 1
1956                 BCE    NP,101,%                                       12  07946  B 07959 00101 %
1957                 H                                                        1  07958  .
1958      * SUB-RTN 19.43   CHECK MRZG
1959      NP         MLCWS  ALLBIT,101                                      12  07959  D 09071 00101 7
1960                 MLCWS  NWM00,102                                       12  07971  D 09002 00102 7
1961                 MLCWS  ALLBIT,103                                      12  07983  D 09071 00103 7
1962                 MRZG   102,101                                         12  07995  D 00102 00101 !
1963                 C      NWM15,101                                      11  08007  C 09017 00101
1964                 BE     NQ                 SHOULD BRANCH                 7  08018  J 08026 S
```

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PGLIN   LABEL      OPCOD  OPERAND                          CT  AODRS  INSTRUCTION
1965               H                                        1  08025  .
1966    * SUB-RTN 19.44   CHECK MRCG
1967    NQ         MLCWS  AITCH,101                        12  08026  O 09099 00101 7
1968               MLCWS  NWM07,102                       12  08038  O 09009 00102 7
1969               MLCWS  ALL8IT,103                      12  08050  D 09071 00103 7
1970               MRCG   102,101                         12  08062  O 00102 00101 $
1971               C      NWM07,101                       11  08074  C 09009 00101
1972               8E     NR              SHOULD 8RANCH    7  08085  J 08093 S
1973               H                                        1  08092  .
1974    * SU8-RTN 19.45   CHECK MRWG
1975    NR         MLCWS  OELTA,101                       12  08093  D 09077 00101 7
1976               MLCWS  NWM16,102                       12  08105  O 09018 00102 7
1977               MLCWS  ALL8IT,103                      12  08117  O 09071 00103 7
1978               MRWG   102,101                         12  08129  D 00102 00101 *
1979               8W     *&13,101         SHOULO NOT 8RANCH 12  08141  V 08165 00101 1
1980               8CE    NS,101,L                        12  08153  8 08166 00101 L
1981               H                                        1  08165  .
1982    * SU8-RTN 19.46   CHECK MRNWG
1983    NS         MLCWS  EXCLAM,101                      12  08166  O 09101 00101 7
1984               MLCWS  NWM21,102                       12  08178  D 09023 00102 7
1985               MLCWS  ALL8IT,103                      12  08190  D 09071 00103 7
1986               MRNWG  102,101                         12  08202  D 00102 00101 8
1987               8W     *&13,101         SHOULD NOT 8RANCH 12  08214  V 08238 00101 1
1988               8CE    NT,101,N         SHOULO 8RANCH    12  08226  B 08239 00101 N
1989               H                                        1  08238  .
1990    * SU8-RTN 19.47   CHECK MRZWG
1991    NT         MLCWS  NWM63,101                       12  08239  O 09064 00101 7
1992               MLCWS  8LANK,102                       12  08251  O 09066 00102 7
1993               MLCWS  ALL8IT,103                      12  08263  D 09071 00103 7
1994               MRZWG  102,101                         12  08275  O 00102 00101 ;
1995               C      NWM15,101                       11  08287  C 09017 00101
1996               8E     NU              SHOULO BRANCH    7  08298  J 08306 S
1997               H                                        1  08305  .
1998    * SUB-RTN 19.48   CHECK MRCWG
1999    NU         MLCWS  NWM48,101                       12  08306  D 09049 00101 7
```

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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADORS  INSTRUCTION
2000                 MLCWS  TPMARK,102                               12  08318  D 09090 00102 7
2001                 MLCWS  ALLBIT,103                               12  08330  D 09071 00103 7
2002                 MRCWG  102,101                                  12  08342  D 00102 00101 L
2003                 C      NWM15,101                                11  08354  C 09017 00101
2004                 8E     NV                  SHOULD BRANCH         7  08365  J 08373 S
2005                 H                                                1  08372  .
2006      * SUB-RTN 19.49   CHECK SCNL FOR MOVE NO DATA, PROPER ADDR REG STEP
2007      NV         MLCWS  JAY,102                                  12  08373  D 09102 00102 7
2008                 MLCWS  NWM30,103                                12  08385  D 09031 00103 7
2009                 SCNL   102,103             TEST STOP ON A-FIELD WM  12  08397  D 00102 00103 &
2010                 SAR    HOLOA2                                    7  08409  G 09181 A
2011                 SBR    HOLOB2                                    7  08416  G 09186 B
2012                 C      HOLDA2,@00101@      CHECK AAR FOR PROPER STEPPING  11  08423  C 09181 09613
2013                 BU     NW                  SHOULD NOT BRANCH     7  08434  J 08552 /
2014                 C      HOLDB2,@00102@      CHECK BAR FOR PROPER STEPPING  11  08441  C 09186 09618
2015                 BU     NW                  SHOULD NOT BRANCH     7  08452  J 08552 /
2016                 BW     NW,103              SHOULD NOT BRANCH WORD MARK  12  08459  V 08552 00103 1
2017                 BCE    *&8,103,S           SHOULD BRANCH        12  08471  B 08490 00103 S
2018                 B      NW                                        7  08483  J 08552
2019                 SCNL   103,102             TEST STOP ON B-FIELD WM  12  08490  D 00103 00102 &
2020                 SAR    HOLDA2                                    7  08502  G 09181 A
2021                 SBR    HOLOB2                                    7  08509  G 09186 B
2022                 C      HOLOA2,@C0102@                           11  08516  C 09181 09618
2023                 BU     NW                  SHOULD NOT BRANCH     7  08527  J 08552 /
2024                 C      HOLDB2,@00101@                           11  08534  C 09186 09613
2025                 BE     NX                  SHOULD BRANCH & EXIT  7  08545  J 08553 S
2026      NW         H                                                1  08552  .
2027      * SUB-RTN 19.50   CHECK MLN
2028      NX         MLCWS  NWM63,WORK6                              12  08553  D 09064 09176 7
2029                 MLN    BLANK,WORK6                              12  08565  D 09066 09176 A
2030                 BW     *&13,WORK6          SHOULD NOT BRANCH    12  08577  V 08601 09176 1
2031                 BCE    NY,WORK6,&          SHOULD BRANCH        12  08589  B D8602 09176 &
2032                 H                                                1  08601  .
2033      * SUB-RTN 19.51   CHECK MLZ
2034      NY         MLCWS  NWM51,WORK6                              12  08602  D 09052 09176 7
```

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                    CC01  CPU TEST                                                    CC01
PGLIN     LABEL     OPCOD OPERAND                                    CT  ADDRS  INSTRUCTION
2035                MLZ   ATSIGN,WORK6                               12  08614  O 09087 09176 8
2036                BW    *&13,WORK6        SHOULD NOT BRANCH        12  08626  V 08650 09176 1
2037                BCE   NZ,WORK6,3        SHOULD BRANCH            12  08638  B 08651 09176 3
2038                H                                                 1  08650  .
2039      * SUB-RTN 19.52  CHECK MLC
2040      NZ        MLCWS NWM31,WORK6                                 12  08651  O 09032 09176 7
2041                MLC   DASH,WORK6                                  12  08663  D 09078 09176 C
2042                BW    *&13,WORK6        SHOULD NOT BRANCH        12  08675  V 08699 09176 1
2043                BCE   PA,WORK6,-        SHOULD BRANCH            12  08687  B 08700 09176 -
2044                H                                                 1  08699  .
2045      * SUB-RTN 19.53  CHECK MLW
2046      PA        MLCWS NWM09,WORK6                                 12  08700  O 09011 09176 7
2047                MLW   EFF,WORK6                                   12  08712  O 09097 09176 O
2048                C     NWMC9,WORK6                                 11  08724  C 09011 09176
2049                BE    P8                SHOULD BRANCH            7  08735  J 08743 S
2050                H                                                 1  08742  .
2051      * SUB-RTN 19.54  CHECK MLNW
2052      P8        MLCWS ALL8IT,WORK6                                12  08743  D 09071 09176 7
2053                MLNW  NWM00,WORK6                                 12  08755  O 09002 09176 E
2054                BW    *&13,WORK6        SHOULD NOT BRANCH        12  08767  V 08791 09176 1
2055                BCE   PC,WORK6,&        SHOULD BRANCH            12  08779  B 08792 09176 &
2056                H                                                 1  08791  .
2057      * SUB-RTN 19.55  CHECK MLZW
2058      PC        MLCWS PERIOD,WORK6                                12  08792  D 09067 09176 7
2059                MLZW  NWM04,WORK6                                 12  08804  D 09006 09176 F
2060                BW    *&13,WORK6        SHOULD NOT BRANCH        12  08816  V 08840 09176 1
2061                BCE   PD,WORK6,#                                  12  08828  B 08841 09176 #
2062                H                                                 1  08840  .
2063      * SUB-RTN 19.56  CHECK MLCW
2064      PD        MLCWS DELTA,WORK6                                 12  08841  D 09077 09176 7
2065                MLCW  NWM16,WORK6                                 12  08853  O 09018 09176 G
2066                BW    *&13,WORK6        SHOULD NOT BRANCH        12  08865  V 08889 09176 1
2067                BCE   *&2,WORK6,8                                 12  08877  B 08890 09176 8
2068                H                                                 1  08889  .
2069                WCP   PASS                                       10  08890  M %TO 08921 W
```

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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2070                BCB1   *-16                                      7  08900  R 08890 2
                                                                                G
2071                8A1    *&1                                       7  08907  R 08914 M
2072                8      QV                                        7  08914  J 08935
2073      PASS      DCW    @CC01 COMPLETE@,G                        13  08921
                                                                                          D
2074      QV        MRCWG  RTC&1,333                                 12  08935  D 08967 00333 L
2075                MLCS   332,339                                   12  08947  D 00332 00339 3
2076                B      322                                       7  08959  J 00322
2077      RTC       BCB1   322                                       7  08966  R 00322 2
                                                                                G
2078                8A1    346                                       7  08973  R 00346 M
2079                8      1972                                      7  08980  J 01972
                           G
2080                DCW    @M@                                       1  08987
2081      *
2082      RESET     CW     JF&1                                      6  08988  ¤ 03818
2083                8      START                                     7  08994  J 02000
2084                H                        DEFINE PRECEDING BRANCH LENGTH  1  09001  *
2085      *
2086      *                  CONSTANTS AND WORK AREAS
2087      *
2088      *
2089      NWM00     DC     @ @                                       1  09002
2090      NWM01              @1@                                     1  09003
2091      NWM02              @2@                                     1  09004
2092      NWM03              @3@                                     1  09005
2093      NWM04              @4@                                     1  09006
2094      NWM05              @5@                                     1  09007
2095      NWM06              @6@                                     1  09008
2096      NWM07              @7@                                     1  09009
2097      NWM08              @8@                                     1  09010
2098      NWM09              @9@                                     1  09011
2099      NWM10              @0@                                     1  09012
2100      NWM11              @#@                                     1  09013
2101      NWM12              @@@                                     1  09014
                             .
2102      NWM13              @.@                                     1  09015
                             G
2103      NWM14              @T@                                     1  09016
                             T
2104      NWM15              @M@                                     1  09017
```

PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND	CT	ADDRS	INSTRUCTION
2105	NWM16		@BS@	1	09018	
2106	NWM17		@/@	1	09019	
2107	NWM18		@S@	1	09020	
2108	NWM19		@T@	1	09021	
2109	NWM20		@U@	1	09022	
2110	NWM21		@V@	1	09023	
2111	NWM22		@W@	1	09024	
2112	NWM23		@X@	1	09025	
2113	NWM24		@Y@	1	09026	
2114	NWM25		@Z@	1	09027	
2115	NWM27		@,@	1	09028	
2116	NWM28		@%@	1	09029	
2117	NWM29		@SW@	1	09030	
2118	NWM30		@SB@	1	09031	
2119	NWM31		@MS@	1	09032	
2120	NWM32		@-@	1	09033	
2121	NWM33		@J@	1	09034	
2122	NWM34		@K@	1	09035	
2123	NWM35		@L@	1	09036	
2124	NWM36		@M@	1	09037	
2125	NWM37		@N@	1	09038	
2126	NWM38		@O@	1	09039	
2127	NWM39		@P@	1	09040	
2128	NWM4C		@Q@	1	09041	
2129	NWM41		@R@	1	09042	
2130	NWM42		@'@	1	09043	
2131	NWM43		@$@	1	09044	
2132	NWM44		@*@	1	09045	
2133	NWM45		@8@	1	09046	
2134	NWM46		@.@	1	09047	
2135	NWM47		@LD@	1	09048	
2136	NWM48		@&@	1	09049	
2137	NWM49		@A@	1	09050	
2138	NWM50		@B@	1	09051	
2139	NWM51		@C@	1	09052	
2140	NWM52		@D@	1	09053	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
2141	NWM53		@E@	1	09054	
2142	NWM54		@F@	1	09055	
2143	NWM55		@G@	1	09056	
2144	NWM56		@H@	1	09057	
2145	NWM57		@I@	1	09058	
2146	NWM58		@M@ (Q)	1	09059	
2147	NWM59		@.@	1	09060	
2148	NWM60		@¤@	1	09061	
2149	NWM61		@B@ (L)	1	09062	
2150	NWM62		@T@ (L)	1	09063	
2151	NWM63		@M@ (G)	1	09064	
2152	NWM26		@+@	1	09065	
2153	*					
2154	TABLE	DCW	@ @	1	09066	
2155	PERICD		@.@	1	09067	
2156	LOZNGE		@¤@ (L)	1	09068	
2157	LBRAKT		@U@ (L)	1	09069	
2158	LESS		@T@ (G)	1	09070	
2159	ALLBIT		@M@	1	09071	
2160	AMPSND		@&@	1	09072	
2161			@$@	1	09073	
2162	SPLAT		@*@ (R)	1	09074	
2163	RBRAKT		@B@	1	09075	
2164			@,@ (.)	1	09076	
2165	DELTA		@L@ (D)	1	09077	
2166	DASH		@-@	1	09078	
2167			@/@	1	09079	
2168	COMMA		@,@	1	09080	
2169	PERCNT		@%@	1	09081	
2170	WDSEP	DC	@S@ (W)	1	09082	
2171	BKSLSH	DCW	@S@ (B)	1	09083	
2172	SEGMRK		@M@ (S)	1	09084	
2173	SUBLNK		@B@ (S)	1	09085	
2174	POUND		@#@	1	09086	
2175	ATSIGN		@@@	1	09087	

PGLIN	LABEL	OPCOD	OPERANC	CT	AODRS	INSTRUCTION
2176	CCLCN		â.â	1	09088	
2177	GREATR		âGâ	1	09089	
2178	TPMARK		âTâ	1	09090	
2179	QUESTN		âMâ	1	09091	
2180	AYE		âQâ	1	09092	
2181	BEE		âAâ	1	09093	
2182	SEE		âBâ	1	09094	
2183	DEE		âCâ	1	09095	
2184	EEE		âDâ	1	09096	
2185	EFF		âEâ	1	09097	
2186	GEE		âFâ	1	09098	
2187	AITCH		âGâ	1	09099	
2188	EYE		âHâ	1	09100	
2189	EXCLAM		âIâ	1	09101	
2190	JAY		â.â	1	09102	
2191			âJâ	1	09103	
2192	ELL		âKâ	1	09104	
2193	EMM		âLâ	1	09105	
2194			âMâ	1	09106	
2195	CH		âNâ	1	09107	
2196	PEA		âOâ	1	09108	
2197	QUEUE		âPâ	1	09109	
2198	ARE		âQâ	1	09110	
2199	RCDMRK		âRâ	1	09111	
2200	ESS		â#â	1	09112	
2201	TEA		âSâ	1	09113	
2202			âTâ	1	09114	
2203	VEE		âUâ	1	09115	
2204	DBLYCU		âVâ	1	09116	
2205	EKS		âWâ	1	09117	
2206	WYE		âXâ	1	09118	
2207	ZEE		âYâ	1	09119	
2208	NAUGHT		âZâ	1	09120	
2209	ONE		â0â	1	09121	
2210	TWO		â1â	1	09122	
2211	THREE		â2â	1	09123	
			â3â			

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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2212      FOUR              @4@                                      1  09124
2213      FIVE              @5@                                      1  09125
2214      SIX               @6@                                      1  09126
2215      SEVEN             @7@                                      1  09127
2216      EIGHT             @8@                                      1  09128
2217      NINE              @9@                                      1  09129
2218      *
2219      K01       DC      @M@                                      1  09130
2220                DCW     @N@                                      1  09131
2221       K02              @&+@                                     2  09132
2222      K03       DC      @8@                                      1  09134
2223                DCW     @N@                                      1  09135
2224       K04              @L+@                                     2  09136
2225      K05               @MN@                                     2  09139
2226      K06       DC      @ @                                      1  09140
2227                DCW     @+@                                      1  09141
2228      K07               @IN@                                     2  09143
2229      K08       DC      @6@                                      1  09144
2230                DCW     @+@                                      1  09145
2231      K09               @MN@                                     2  09147
2232      K10       DC      @-@                                      1  09148
2233                DCW     @+@                                      1  09149
2234      K11               @PN@                                     2  09151
2235      K12       DC      @Y@                                      1  09152
2236                DCW     @+@                                      1  09153
2237      K13       DC      @M@                                      1  09154
2238                DCW     @N@                                      1  09155
2239       K14              @ +@                                     2  09156
2240      *
2241      WORK1     DCW     @ @                                      1  09158
2242      WORK2             @ @                                      1  09159
2243      WORK3             @  @                                     2  09161
2244      WORK4             @              @                        10  09171
2245      WORK5             @& B-@                                   4  09175
2246      WORK6             @ @                                      1  09176
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2247      *
2248      *
2249      *                OTHER CONSTANTS AND WORK AREAS
2250      *
2251      HOLDA     DCW    @      @                                   5  09181
2252      HOLDB            @      @                                   5  09186
2253      PCC              F00100              LOOP COUNT CONSTANT     5  09191
2254      PCCWK            @      @            LOOP COUNT WORK AREA   5  09196
2255      P1               @   @                                      3  09199
2256      P2               @   @                                      3  09202
2257      TADHLD           @          @                               9  09211
2258      SPECL1           @F.¤BTM@                                   6  09217
2259      SPECL2           @B,%SSM@                                   6  09223
2260      SPECL3           @ #@.TM@                                   6  09229
2261      SPECL4           @-$*B,L@                                   6  09235
2262      ALPHA            F123                                       3  09238
2263      ALFADD           ALPHA-2                                    5  09243  09236
2264      BETADD           WORK3-2                                    5  09248  09159
2265      FIVE9S           F99999                                     5  09253
2266      AADDR1           FIELD1-3                                   5  09258  09274
2267      BADDR1           FIELD2-3                                   5  09263  09277
2268      AADDR2           FIELD3-3                                   5  09268  09280
2269      BADDR2           FIELD4-3                                   5  09273  09284
2270      FIELD1           @9M8G@                                     4  09277
2271      FIELD2           @¤9G@                                      3  09280
2272      FIELD3           @,IG@                                      3  09283
2273      FIELD4           @ /.G@                                     4  09287
2274      LIMIT            @    @                                     4  09291
2275      HISTRT           @  @                                       2  09293
2276      LOSTRT           @  @                                       2  09295
2277      HICNT            @  @                                       2  09297
2278      LOCNT            @  @                                       2  09299
2279      FIVE4S           @54EDNMVU.&S%B*B¤@                        16  09315
2280      MANY9S           @9999999999999991@                        16  09331
2281      PRODCT           @054545454545454534545454545454545F@      33  09364
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2282      BIGANS           a                                        a  33  09397
2283       MPYTBL          a GLL  Q          D.R                   a  33  09398
                           a MTBU.MIHGFEDCBA&L,B*$.RQPONMLKJ-a
2284                       a MSS%,*ZYXWVUTS/BMT.a#0987654321 a      32  09462
                            SEW          STG.
2285      *
2286                DCW    a-*0&&*0&-*0&-*0&-*0&-*0&*a              25  09487
2287                DC     a*C&-00&-*&&-*0*-*0&0*0&-&a              25  09512
2288      TRASH            a0&-**&-*00-*0&&*0&-*0&-*0a              25  09537
2289      *
2290      LOADER  EQU      40C
2291      TAC0    EQU      10C0
2292      TAC1    EQU      10C1
2293      TAD2    EQU      10C2
2294      TAD3    EQU      10C3
2295      TAD4    EQU      10C4
2296      CPU     EQU      1256
2297      MEMSIZ  EQU      1257
2298      TYPE    EQU      18C0
2299      TYPCK   EQU      1845
2300      AA      EQU      1931
2301      BLANK   EQU      TABLE
2302      CBIT    EQU      NWM00
2303      MINUS7  EQU      PEA
2304      MINUS8  EQU      QUEUE
2305      MINUS0  EQU      EXCLAM
2306      DIVSOR  EQU      WORK7
2307      DIVDND  EQU      WORK8
2308      QUOREM  EQU      P1
2309      QUOTNT  EQU      WORK10
2310      XR0     EQU      24
2311      TPMK    EQU      NWM15
2312      QUOT    EQU      NWM31
2313      DELT    EQU      NWM47
2314      GPMK    EQU      NWM63
2315      GMWM    EQU      ALLBIT
2316      HOLDA1  EQU      HOLDA
2317      HOLDA2  EQU      HOLDA
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PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
2318	HOLDA3	EQU	HOLDA			
2319	HOLDA4	EQU	HOLDA			
2320	HOLDB1	EQU	HOLDB			
2321	HOLDB2	EQU	HOLDB			
2322	HOLDB3	EQU	HOLDB			
2323	HOLDB4	EQU	HOLDB			
2324		LTORG	*		09538	
2324			&54321	5	09542	
2324			&9876	4	09546	
2324			&123	3	09549	
2324			&45679	5	09554	
2324			-45679	5	09559	
2324			-54321	5	09564	
2324			-1	1	09565	
2324			@9RIY@	4	09569	
2324			&0	1	09570	
2324			&7	1	09571	
2324			&8	1	09572	
2324			&1	1	09573	
2324			JD	5	09578	03747
2324			JC	5	09583	03740
2324			RESET	5	09588	08988
2324			KFC2	5	09593	04504
2324			POUND	5	09598	09086
2324			KFC7	5	09603	04558
2324			KFC6	5	09608	04551
2324			@0C101@	5	09613	
2324			@0C102@	5	09618	
2325		END	2000			J02000

END OF ASSEMBLY